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PATTERN AND MEDICOLEGAL MANAGEMENT OF POISONING CASES AT EMERGENCY CARE DEPARTMENT (CASUALTY) OF TERTIARY CARE CENTER OF RURAL TERTIARY CENTER IN EASTERN MAHARASHTRA (CENTRAL INDIA).

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Abstract:
Introduction: Poisoning cases are common and reported to any tertiary care hospital's emergency department (casualty). Apart from emergency medical management of poisoning cases, it has various medicolegal aspects that must be addressed appropriately by treating doctors to avoid unnecessary legal litigations. The study analyze the patterns of poisoning cases and the associated medicolegal issues reported to the casualty department.
Methods: The study was conducted at the emergency department of the medical college located in eastern Maharashtra (Central India). One hundred ninety-two cases of poisoning were included in the study over one year.
Results: Study shows a predominance of Male sex, rural residence, use of insecticide, and suicidal Manner as significant factors among the patients.
Conclusion: The current study is conducted in the Hospital's casualty department. The study will help create awareness among medical practitioners regarding the patterns and management of poisoning cases. The study is also helpful in finding various influential factors for poisoning and will help set guidelines to avoid such issues.

Key Words: Poisoning, casualty department, medicolegal management.

Introduction:

Death due to poisoning is a significant health issue in India. The problem is more severe in rural areas of India. Most of the cases of poisoning are due to consumption of pesticides [1]. The use of pesticides is directly linked to several poisoning cases from the concerned locality and occupations. The eastern region of Maharashtra is known for its Number of farmer suicide cases. The state of Maharashtra recorded around 2,500 suicides by farmers from the year 2021, and a record 2,547 farmer suicides asses in 2020. Out of these figures, over 50% of death cases are coming from the eastern region, i.e., Vidarbha region of Maharashtra, during both years, and the Number of cases is

rising from this particular area. [2] This study included the cases of poisoning reported to the casualty of a medical college from eastern Maharashtra, where the problem of farmer suicide is more prevalent. The study is analyzed based on various sociodemographic parameters to find out influential factors regarding the cause of this issue.
Similarly, poisoning cases involve various medicolegal issues that must be handled carefully by treating doctors to avoid unnecessary litigation by a court of law. The present study also focuses on how the various medicolegal problems in case of poisoning are handled at the casualty of medical college.

Poisoning is a critical public health issue, particularly in low- and middle-income countries, where it contributes significantly to morbidity and mortality rates. India, with its diverse socioeconomic landscape, faces a substantial burden of poisoning cases, especially in rural areas. Eastern Maharashtra, a region characterized by its predominantly agrarian economy and rural population, is particularly vulnerable to poisoning incidents. These cases often arise from the misuse of agricultural pesticides, accidental ingestion of household chemicals, or intentional self-poisoning due to various socio-economic pressures. The types of poisons encountered can vary widely, including organophosphates, which are common in agricultural settings, as well as household chemicals, pharmaceuticals, and traditional herbal substances. The pattern of poisoning in this region is influenced by factors such as agricultural practices, availability of toxic substances, socio-economic status, and cultural beliefs, all of which play a role in the epidemiology of poisoning cases. The medicolegal aspect of poisoning cases adds another layer of complexity to their management. The seasonal variation in poisoning cases, with certain types of poisoning peaking during specific times of the year, such as during the agricultural planting and harvest seasons, further underscores the need for region-specific data to inform clinical practice.

Material and Methods

This study was designed as a retrospective observational analysis, focusing on poisoning cases reported to the casualty department of Shalinitai Meghe Hospital & Research Centre, Nagpur. The retrospective nature of the study involved reviewing and analyzing existing patient records over a period of one year, from January 2022 to December 2023. This region is known for its high incidence of farmer suicides, primarily due to economic distress and agricultural practices. The hospital serves as a key healthcare facility in a rural setting, providing emergency care and forensic services. The setting is significant due to its geographical and socio-economic context, which influences the patterns of poisoning cases observed.
The study included a total of 192 poisoning cases reported to the casualty department during the study period. Inclusion criteria were based on having a confirmed history of poisoning, with cases verified through patient records and medical documentation. Only live cases were considered for the study; cases where patients were brought dead were excluded from the analysis. The selection process aimed to ensure that the study focused on cases where active medical and medicolegal interventions were undertaken.

Data Collection

Data were collected from patient records, including demographic details, history of the incident, type of poison consumed, and medicolegal documentation. Information was obtained from patients, relatives, or police. All relevant medicolegal samples, such as gastric lavage and blood, were preserved for chemical analysis

Statistical Methods

Data were analyzed using descriptive statistics, focusing on the distribution of cases by age, gender, residential pattern, seasonal variation, type of poison, and manner of incidence. Statistical software was used to generate frequency distributions, percentages, and other relevant metrics to facilitate a

comprehensive analysis of the data. The results were compared with existing literature to draw meaningful conclusions and highlight trends in poisoning cases.

Results

The table details poisoning cases by age and gender. In the under-10 age group, there were 4 cases (2.08%), split evenly between males and females. The 11–20 year group had 19 cases (9.89%), with slightly more females. The 21–30 year group had the highest number of cases, with 86 cases (44.79%), predominantly male. The 31–40 year group had 38 cases (19.79%), mostly male, while the 41–50 year group had 29 cases (15.10%), also mostly male. The 51–60 year group had 16 cases (8.33%), with a significant gender imbalance favoring males. Overall, there were 151 male cases (78.64%) and 41 female cases (21.35%), totaling 192 cases (100%).

Table 1: Age and gender wise distribution of poisoning cases

Age (Years)	Male	Female	Total
< 10	2	2	4 (2.08%)
11 – 20	9	10	19 (9.89%)
21 – 30	68	18	86 (44.79%)
31 – 40	33	5	38 (19.79%)
41 – 50	24	5	29 (15.10%)
51 – 60	15	1	16 (8.33%)
Total	**151 (78.64 %)**	**41 (21.35%)**	**192 (100%)**

Considering the residential pattern of victims of poisoning cases, the present study shows that the maximum cases were from rural areas. Of 192 cases, 135 (70.31%) belong to Rural regions, and 57 (29.68%) cases belong to urban areas.

Table 2: Cases as per the Residential pattern of the patient

Total Number of poisoning cases (n)	Urban	Rural
192	57 (29.68%)	135 (70.31%)

The present study shows most of the cases of poisoning occurred during the rainy season, i.e., 84 cases (43.75) followed by 57 (29.68%) cases during the summer season.

Table 3: Poisoning cases as per seasonal variation

Month (Season)	Cases	Percentage
March to Jun (Summer)	57	29.68%
July to Oct (Rainy)	84	43.75%
Nov to Feb (Winter)	51	26.56%
Total	192	100%

The finding from the present study shows 155 (80.72%) cases of suicide in Manner, and 37 (19.27%) cases were accidental in Manner.

Table 4: Cases of poisoning as per manner of incidence

Manner of incidence	Cases	Percentage
Suicidal	155	80.72%
Accidental	37	19.27%
Total	192	100%

Regarding the type of poison consumed, the maximum Number of cases had a history of consumption of Agrochemical (pesticides), i.e., 103 (53.64%) cases, followed by 21 (10.93%) cases with a history of consumption of rodenticides.

Table 5: Cases of poisoning as per the type of poison consumed

Name of poison	Cases	Percentage
Alcohol	19	9.89%
Agrochemicals (Pesticide)	103	53.64%
Naphthalene	4	2.08%
Drug overdose	17	8.85%
Phenol	16	8.33%
Rodenticide	21	10.93%
Unknown	11	5.72%
Total	192	100

Out of 192 cases included in the current study, in all cases, i.e., in (100%) cases, gastric lavage and a blood sample were preserved for chemical analysis.

Table 6: Samples preserved in poisoning cases

Name of Sample for chemical analysis	Preserved	Not Preserved	Total
Gastric lavage	192	0	192
Blood	192	0	192

Police were informed in all cases (100%) of poisoning included in the present study.

Table 7: Documentation of Medicolegal importance done in poisoning cases

Documents	Done	Not done	Total
Police Information Report	192	0	192 (100%)
Medical Examination Report (Injury Report)	192	0	192 (100%)

Discussion:

The findings of our study show that the maximum Number of cases was from the age group of 21-30 years, followed by the age group of 31 – 40 years and 41 – 50 years. The study shows that male cases outnumbered female cases with a male-to-female ratio of 3.68: 1. Hence, it is evident from the survey that most of the victims are young and working. Children and old age people are less commonly involved. Our study's results are similar to those of various studies conducted by different authors.

On going through the study conducted by various authors like Unnikrishnan et al.,[3] Dash SK et al.[4], Gurudatt KS et al., [5] Shetty VB et al., six and Vanaja K et al., seven it is evident that young age people of age group 21-30 years are commonly involved in cases of poisoning. So, our age group findings match the studies mentioned above.

Similarly, the findings of our study regarding male sex predominance in cases of poisoning match the studies conducted by Hettiarachchi et al., eight and Siwach SB et al.,9.

This particular age is more prone to poisoning cases; the reason could be that these persons are stressed with various issues regarding jobs, unemployment, education, poverty, lack of opportunity, loss in business, loss in farming by the farmers, and so many others. This is the age when people start earning, and they have a lot of responsibility regarding their careers and also have the responsibility for their families. So, various socioeconomic conditions make them prone to suicidal poisoning. Similarly, accidental poisoning is also common in the young age group as, at this age, people are involved in agricultural jobs where they get contacted by various insecticides.

Our study shows that most cases (70.31%) are from rural areas. The survey done by Dash SK et al. four and the analysis done by Shetty VB et al.,[6] reflect similar findings from their studies where rural cases of poisoning are more common than urban cases.

The possibility of predominant rural involvement could be that farmer populations are common in rural areas. Most of the people from rural areas depend on agriculture-related activities. The area where this study was conducted is known for farmer suicide cases, and the most commonly used method for suicide is the consumption of insecticides.

Traditional farming methods, lack of irrigation facilities, and lack of alternate job opportunities are the common factors that make the farmers vulnerable to such action.

Data from our study suggest that most of the cases of poisoning, i.e. (43.75%), occur during the rainy season, i.e., between the months of July to October. Regarding seasonal variations, our study contradicts the findings of Dash SK et al.,3, which mentioned that the maximum Number of cases of poisoning occurred in the summer.
Seasonal variation and dominance of cases in the rainy season could be associated with agriculture and the rain pattern of the area where the study is conducted. Eastern Maharashtra is a region where rain occurs only between *the months of July and October, and adequate irrigation facilities are needed for farmers. Hence, all crop production depends on rainwater. Most of the agricultural-related work is done during this season only. Farmers take debt for performing various agricultural-related activities during this season. So, they are overburdened with the stress of work and debt. So, any unusual rain pattern or any additional family issue increases stress on him, and he may try to commit suicide. Suicide is commonly done by consumption of pesticides, which are easily accessible during the rainy season. To support the above conclusion, the study also suggests that the maximum Number of poisoning cases (53.64%) are due to the consumption of Agrochemicals, i.e., pesticides, and the most common Manner of poisoning is suicidal in nature, i.e. (80.72%) of total cases.

The current study shows a maximum Number of poisoning cases, i.e. (53.64%) out of 192 cases that have occurred due to the consumption of agrochemicals (pesticides). The findings from the study done by Unnikrishnan et al., [3] Hettiarachchi et al., [eight] and Gupta BD et al.,[10] Prakash C et al., [11] are similar to the finding from our study where insecticides used for agricultural purposes are commonly seen as a source of poisoning. However, our findings regarding the use of agrochemicals as the most common poison contradict the finding from the study conducted by Siwach SB et al., 9, where Aluminium phosphide is mentioned as the most commonly used poison in poisoning cases. This variation is a regional variation. In northern India, there is more production of wheat and rice, and aluminum phosphide is used as a preservative of grains. Hence, aluminum phosphide is readily available to farmers. However, in our case, the use of insecticides is commonly seen in the case of poisoning.

The present study shows amongst the 192 cases, the everyday Manner of poisoning was suicidal, i.e., in 155 (80.72%) cases. This is followed by accidental 37 (19.27%) cases. In the studies conducted by Unnikrishnan B et al.,[3] Gurudatt KS et al.,[5] Shetty VB et al., [6] Hettiarachchi et al.,[8] Bhardwaj DN et al., nine and Gupta BD et al., ten have also mentioned that suicide is the most common Manner of poisoning followed by accidental poisoning.

It is evident from the various studies quoted in this paper and from the findings of our study that suicide is the primary intention in poisoning cases, and agrochemicals are found to be the most commonly used substance in most of the poisoning cases. This can be related to the fact that, even for more minor issues, people have found suicide as a solution by the use of agrochemicals that are readily available and which could be easily consumed. As the present study includes a rural population, most of the victims are farmers. Agrochemicals are easily accessible to them as these chemicals are commonly kept in their home for agricultural purposes. These people have found agrochemicals to be the most effective poison as they have seen many similar cases resulting in death by the use of these chemicals.

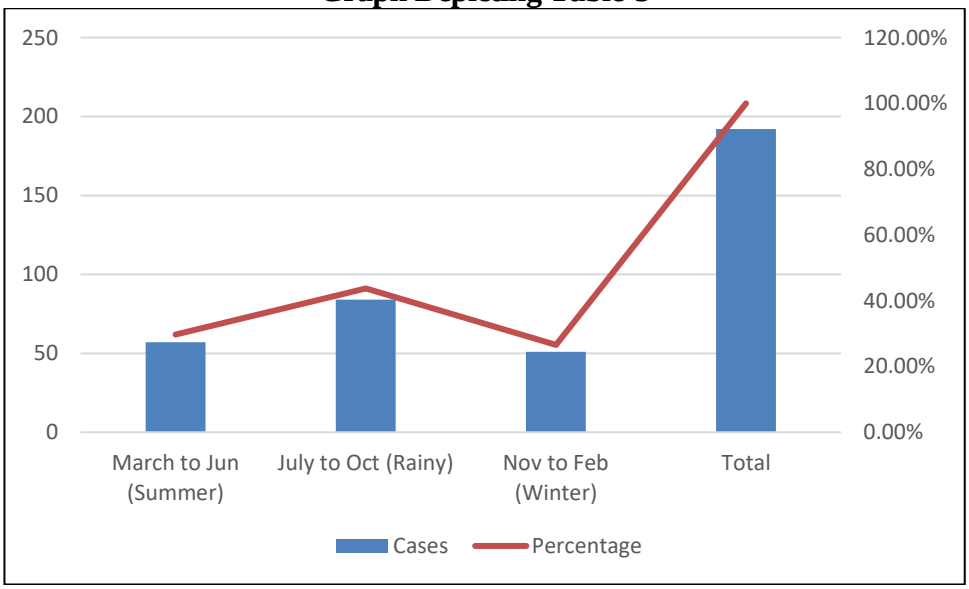
Gastric lavage and blood samples for chemical analysis are preserved in all cases included in this study. Similarly, Police information was collected, and medical examination reports of all cases (injury reports) were generated and kept on record. Medical documentation and sample preservation

are important factors in any case of poisoning to avoid future litigations and help the investigating authorities and judiciary render proper justice.

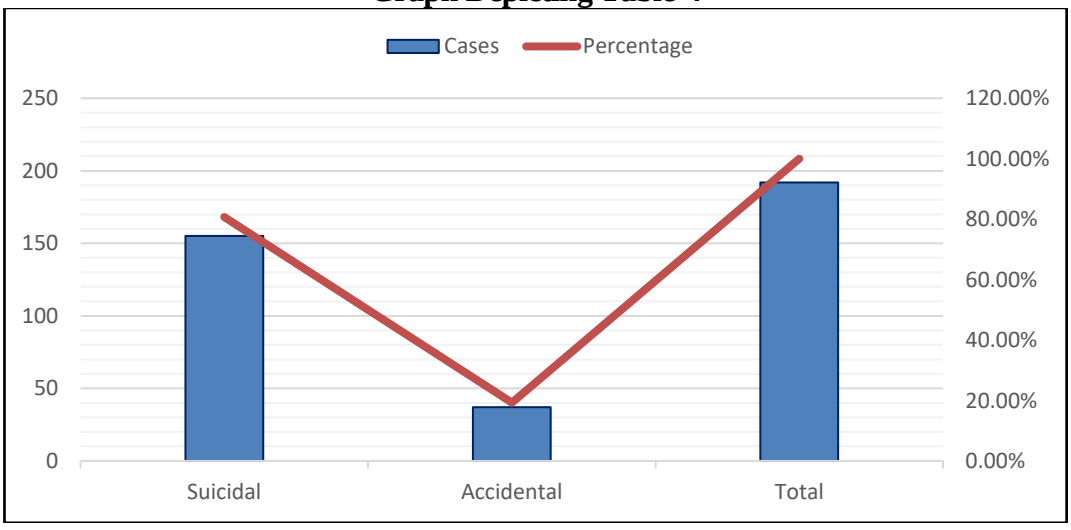
Conclusions:

The current study and all other relevant study show Male sex, younger age, rural population, use of insecticide, and suicidal intention are common factors associated with poisoning. As most of the younger and working-age population are involved, it is a significant loss to the affected families and a massive loss to the nation. Policy should be developed to introduce more job opportunities in rural areas, enhance the education of youth, increase irrigation facilities, and introduce newer and advanced techniques in agriculture. People should be encouraged to do agri-related business-like dairy, poultry, etc., to add additional sources of income. Newer pesticides that are less harmful to the human body should be developed and marketed. Basic medicolegal formalities like communication with police, gastric lavage, and blood sample preservation for chemical analysis, as well as preserving medical records, should be done at casualty by concerned doctors in case of poisoning.

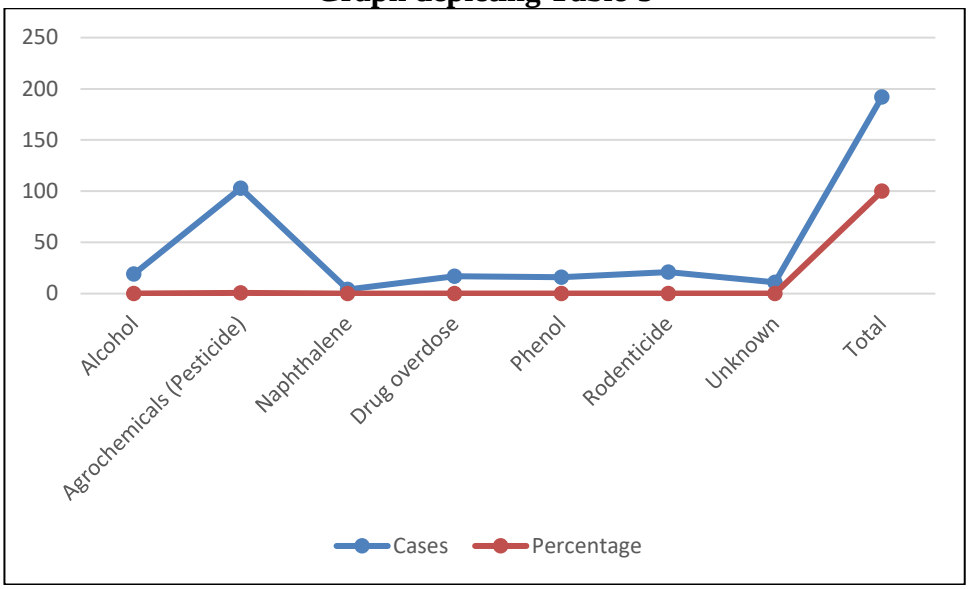
Poisoning cases as per seasonal variation: (N=192)
Graph Depicting Table-3



Cases of poisoning as per Manner of incidence: (N=192)
Graph Depicting Table-4



Cases of poisoning as per the type of poison consumed: (N=192)
Graph depicting Table-5



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